

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1. (currently amended) A low dead volume extraction column comprising:
 - i) a column body having an open upper end for attachment to a pump, an open lower end for passing fluid into and out of the column body, and an open channel between the upper and lower end of the column body, wherein the column body comprises a pipette tip;
 - ii) a bottom frit bonded to and extending across the open channel, the bottom frit having a pore volume;
 - iii) a top frit bonded to and extending across the open channel between the bottom frit and the open upper end of the column body, the top frit having a pore volume, wherein the top frit and bottom frit are less than 350 microns thick, and wherein the top frit, bottom frit, and channel surface define an extraction media chamber; and
 - iv) a bed of extraction media positioned inside the extraction media chamber.
2. (original) The low dead volume extraction column of claim 1, wherein the bottom frit is located at the open lower end of the column body.
3. (original) The low dead volume extraction column of claim 1, wherein the bottom frit is less than 200 microns thick.
4. (original) The low dead volume extraction column of claim 1, wherein the bottom frit has a pore volume equal to 10 % or less of the interstitial volume of the bed of extraction media.
5. (previously presented) The low dead volume extraction column of claim 1, wherein the bottom frit has a pore volume of less than 1 microliter.
6. (original) The low dead volume extraction column of claim 1, wherein the extraction media comprises a packed bed of gel-type packing material.
7. (previously presented) The low dead volume extraction column of claim 6, wherein the gel-type packing material is selected from the group consisting of agarose and sepharose.
8. (previously presented) The low dead volume extraction column of claim 1, wherein the bed of extraction media has a bed volume of in the range of 0.5 to 20 microliters.
9. (original) The low dead volume extraction column of claim 1, wherein the bottom frit is a membrane screen and the top frit is optionally a membrane screen.

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10. (previously presented) The low dead volume extraction column of claim 9, wherein membrane screen comprises a nylon or polyester woven membrane.
11. cancelled
12. (original) The low dead volume extraction column of claim 1, wherein the extraction media comprises an affinity binding group having an affinity for a biological molecule of interest.
13. (previously presented) The low dead volume extraction column of claim 12, wherein the affinity binding group is selected from the group consisting of Protein A, Protein G, Protein L and an immobilized metal.
14. (currently amended) The low dead volume extraction column of claim 1, wherein at the column body comprises a polycarbonate, polypropylene or polyethylene material.
15. (previously presented) The low dead volume extraction column of claim 1, wherein the top frit and the bottom frit are bonded to the column body by gluing or welding.
16. (previously presented) The low dead volume extraction column of claim 1, wherein the volume of the extraction media chamber at most 1000 microliters.
17. (previously presented) The low dead volume extraction column of claim 1, wherein the bed of extraction media has a dry weight of less than 10 mg.
18. (previously presented) The low dead volume extraction column of claim 1, wherein the extraction media comprises an extraction bead selected from the group consisting of affinity beads used for protein purification, ion exchange beads used for protein purification, hydrophobic interaction beads used for protein purification, reverse phase beads used for nucleic acid or protein purification, agarose protein G beads used for IgG protein purification, and Hypercell beads used for IgG protein purification.
19. cancelled
20. (original) The low dead volume extraction column of claim 1, wherein the upper end of the column body is attached to a pump for aspirating fluid through the lower end of the column body.
21. (currently amended) The low dead volume extraction column of claim 20, wherein the pump is a pipettor, or a syringe, ~~a peristaltic pump, an electrokinetic pump, or an induction based fluidics pump.~~
22. (original) The low dead volume extraction column of claim 1 comprising:

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- i) a lower tubular member comprising the lower end of the column body, a first engaging end, and a lower open channel between the lower end of the column body and the first engaging end; and
- ii) an upper tubular member comprising the upper end of the column body, a second engaging end, and an upper open channel between the upper end of the column body and the second engaging end, the top membrane screen of the extraction column bonded to and extending across the upper open channel at the second engaging end;
wherein the first engaging end engages the second engaging end to form a sealing engagement.

23-34. cancelled